REMARKS

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuyama et al (Mastsuyama) USPAT 6,469,765 in view of Sato USPAT 6,160,601. Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuyama in view of Sato, as applied to claims 1-6, and further in view of Tani USPAT 6,392,735. Response to the Office Action identified above is listed below.

1. Rejection of Claims 1-6 under 35 U.S.C. 103(a):

As to claims 1, 3 and 4, Matsuyama discloses in Figure 9 and 10, third embodiment (col.21, line 36 through col.22, line 55), a liquid crystal display (LCD) comprises: a first substrate, 900, comprising a first surface; a second substrate, 800, comprising a second surface, the second surface being in parallel with and opposite to the first surface of the first substrate, and a pixel area being defined on the second surface; a second common electrode, 500 (Applicant's first electrode), positioned on the first surface of the first substrate; a first common electrode, 410 (Applicant's second electrode), disposed above the pixel region of the second substrate; the second electrode having side opening portions, 416 (Applicant's first slit) elongated along a first direction; an isolation layer, 812, disposed on the surface of the second substrate to cover the second electrode; a pixel electrode, 300 (Applicant's third electrode), disposed on the isolation layer and within the pixel region, opening portions, 304 (Applicant's

second slit), being defined on the third electrode and along the first direction, the first and second slits being interlaced (per Figures 9 and 10); and a plurality of anisotropic liquid crystal molecules with negative dielectric constant (Abstract) positioned between the first electrode and the third electrode, the longitudinal axis of the liquid crystal molecules being positioned along a second direction horizontally (Figure 3 and col.21, lines 42-45), and a first angle being formed between the first direction and the second direction; wherein a biased electric field is formed as a voltage is applied between the first electrode and the second electrode, such that (a) a first horizontal biased electric field is formed in the neighborhood of the second slit (Figure 4), the first horizontal biased electric field is perpendicular to the first direction, and the liquid crystal molecules are rotated to make the longitudinal axis of the liquid crystal molecules in the neighborhood of the second silt being in parallel to the first direction, (b) the longitudinal axis of the liquid crystal molecules in the neighborhood of the first electrode maintain along the second direction because no horizontal biased electric field is formed near the first electrode, and (c) the liquid crystal molecules between the first electrode and the second slit of the third electrode gradually rotate from the second direction to the first direction, wherein the second electrode, 410, is a transparent common electrode (Applicant's second common electrode)(col.15, lines 14-17 and col.21, lines 42-45) and wherein the third electrode, 300, is a transparent pixel electrode (Applicant's second

common electrode).

However, Matsuyama does not explicitly disclose a display wherein the second electrode, 410, is a pixel electrode and wherein the third electrode, 300, is a lower common electrode.

Sato teaches in his first embodiment (Figures 7 and 8) a TFT substrate that has the pixel electrode above the common electrode with a bottom gate TFT (col.8, lines 63-65) is functionally equivalent (col.12, lines 7-11) to his second embodiment (Figures 10 and 11) a TFT substrate that has the common electrode above the pixel electrode with a top gate TFT (col.11, lines 59-61). Furthermore, reversal of parts is considered an obvious expedient, MPEP 2144.04, VI, A.

Sato is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a pixel electrode below a common electrode as an art recognized equivalent, MPEP 2144.06.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Matsuyama with the art recognized equivalent of Sato.

As to claim 2, Matsuyama discloses the liquid crystal display of claim 1, further comprising a first polarizer, 910, positioned above the first substrate, and a second polarizer, 810, positioned below the second substrate (col.14, lines 58-65 and col.21, lines 42-45).

As to claim 5, the recitation of: wherein the biased electric field formed between the second electrode and the third electrode is used to accelerate the rotation of the liquid crystal molecules so as to reduce a driving voltage of the liquid crystal display, is an intended use and/or performance recitation in a device claim that is considered inherently met by the structure of Matsuyama in view of Sato.

As to claim 6, the recitations of: wherein the isolation layer is used to isolate the pixel electrode from the second common electrode and avoid a short circuit between the pixel electrode and the second common electrode, is an intended use and/or performance recitation in a device claim that is considered inherently met by the structure of Matsuyama in view of Sato.

Response:

In accordance with Section 2141 of the MPEP, the Graham Factual states that the references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination when applying 35 U.S.C. 103. That means, the combination of teachings of the prior arts must be considered as a whole no matter how much weight is given to each of the different prior arts. Furthermore, the combination of teachings of the prior arts must be considered as a whole no matter what portions are relied on from each of the different prior arts. **According to 35 U.S.C. 103, in no case should the references be cut into pieces.**

It is very obvious that the combination teaching of Matsuyama and Sato, quoted by the Examiner, is not considered as a whole. In fact, only one paragraph of Sato's teaching (the paragraph col.12, lines 7-11) is quoted and combined with the teaching of Matsuyama. If the combination of Matsuyama's teaching and Sato's teaching is regarded as "be considered as a whole", the electrode added to Sato's teaching (the second common electrode 500 shown in Fig.10) will disturb the original electric field distribution disclosed by Sato. Therefore, the balance between the flexo-electric effects generated above the first and second comb-shaped electrodes 101 and 102 are broken to induce unequal amount of electric charges residual on the first and second comb-shaped electrodes 101 and 102. As a result, the after-image phenomenon, that Sato's invention wants to solve, is going to happen again very possibly. That means, the combination of Matsuyama's teaching and one piece of Sato's technical description works against Sato's overall teaching. In summary, the teachings of Matsuyama and Sato should not be combined because the combination teachings of Matsuyama and Sato suggested by the examiner fails to take Sato's teaching as a whole and such combination works against Sato's teaching.

According to Sato's teaching, the flexo-electric relieving layer 103 is used to ensure that a dielectric distance of a dielectric layer formed between the first comb-shaped electrode 101 and the liquid crystal layer 130 is approximately equal to a dielectric distance

of a dielectric layer formed between the second comb-shaped electrode 102 and the liquid crystal layer 130. That means, unexpected capacitors are not generated because a dielectric distance is defined as a capacitance per a unit area, and the dielectric distance is taught to be equal. In addition, an intensity of flexo-electric effects generated above the first and second comb-shaped electrodes 101, 102 are balanced. When in-plane switching is over, an amount of electric charges residual on the first comb-shaped electrode 101 is equal to an amount of electric charges residual on the second comb-shaped electrode 102 since there is no unexpected capacitor. As a result, a voltage based on a direct current is not residual to prevent an after-image from occurring. Furthermore, a voltage based on an alternating current is not residual either so that an after-image is not generated because an unexpected capacitor does not exist, when an alternating current is applied to the liquid crystal display disclosed by Sato. Under the circumstances, a two-pole balance is necessary to make the first comb-shaped electrode 101 and the second comb-shaped electrode 102 exchangeable. The combination of teachings of Matsuyama and Sato suggested by the examiner actually discloses a three-pole condition. In such a condition, the original electrical field distribution is changed. In other words, the two-pole balance is broken making the first comb-shaped electrode 101 and the second comb-shaped electrode 102 not exchangeable. The combination of teachings of Matsuyama and Sato fails to teach a solution to this. Therefore, the teachings

of Matsuyama and Sato should not be combined in such a way to break the balance condition existing between the two poles since neither art teaches or suggests a solution to the above problem. In summary, such a combination is unobvious and is not proper under 35 U.S.C. 103.

From the above discussion, the Applicant believes that claim 1 of the present application is absolutely different from the combination of Matsuyama's disclosure and Sato's disclosure. Reconsideration of the rejection over claim 1 is hereby requested.

As claims 2-6 are dependent upon claim 1, they should be allowed if claim 1 is allowed. Reconsideration of claims 2-6 is therefore requested.

2. Rejection of Claims 7-11 under 35 U.S.C. 103(a):

As to claims 7,8 and 11, Matsuyama in view of Sato discloses the liquid crystal display of claim 1.

Matsuyama in view of Sato does not explicitly disclose the use of a conductive protrusion.

Tani teaches as prior art the use of a conductive columnar spacer (Applicant's protrusion) projected from the first surface of the first substrate, the protrusion being electrically connecting the counter electrode (Applicant's first electrode) with the auxiliary line so that the first electrode and the auxiliary line are held at substantially equal voltage. Since the voltage is applied from a large number of locations to the counter electrode, the resistance between the auxiliary line and the counter electrode

is so small that the voltage at the counter electrode can be surely maintained at a predetermined value (Applicant's reduce signal delay). Also, since no stress is generated, irregular display may not occur, thus improving the display quality, Further, the data bus lines and the scan bus lines may not be disconnected (col.1, lines 40-57).

Tani is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add conductive protrusions to electrically connect a first electrode on a first substrate to conductive elements of like potential on the opposed substrate so the counter electrode can be surely maintained at a predetermined value, so, an irregular display may not occur, thus improving the display quality.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Matsuyama in view of Sato with the conductive protrusions of Tani to electrically connect a first electrode on a first substrate to a third electrode of like potential on the opposed substrate so the counter electrode can be surely maintained at a predetermined value so, an irregular display may not occur, thus improving the display quality.

As to claim 9, Matsuyama discloses a display wherein the third electrode has a width, and the width is reduced by opening portions, 304 (Applicant's second slit), so as to increase an aperture ratio of the display.

As to claim 10, the recitations of: wherein static

charges formed on the first electrode are released through the protrusion after the first electrode is connected to the third electrode, is a performance recitation in a device claim that is considered inherently met by the structure of Matsuyama in view of Sato and further in view of Tani.

Response:

As claims 7-11 are dependent upon claim 1, they should be allowed if claim 1 is allowed. Reconsideration of claims 7-11 is therefore requested.

3. Response to Arguments:

Applicant's arguments filed on 18 August 2003 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are as follows:

(1) Regarding claims 1,2,5, and 6, the instant Application is absolutely different in that *inter alia* the pixel electrode is on the top surface of the bottom substrate in contrast to the Matsuyama pixel electrode on the isolation layer that is in-turn on the first common electrode.

(2) Regarding claims 1,2,5, and 6, Matsuyama never teaches how to avoid short-circuiting.

(3) Regarding claims 3 and 4, a display with a pixel electrode above the common electrode can never produce the same electric field as a display with the common electrode above the pixel electrode.

(4) Regarding claims 7-11, Tani does not teach the use of conductive protrusions extensively and evenly.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that Applicant did not claim a pixel electrode in claims 1,2,5, and 6; Applicant broadly claims a second electrode.

(2) It is respectfully pointed out that Matsuyama discloses the claimed structure, and does not need to teach all beneficial effects inherent to said structure.

(3) It is respectfully pointed out that Sato teaches that electrodes may be reversed in a display. Also, liquid crystal displays often use alternating current, so the electric field produced is likewise alternating. Sato is evidence that reversing or interchanging the pixel electrode and the lower common electrode would have been obvious to those having ordinary skill in the art of liquid crystals at the time the claimed invention was made as an art-recognized species suitable for the intended purpose of comprising switching electrodes (MPEP 2144.07). Examiner does not see in the Specification or the Arguments any unexpected results obtained by the claimed invention.

(4) It is respectfully pointed out that Tani is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add conductive protrusions to electrically connect a first electrode on a first substrate to conductive elements of like potential on the opposed substrate so the counter electrode can be surely maintained at a predetermined value, so, an irregular display may not occur, thus improving the

display quality, per rejection above. Examiner maintains the teaching of Tani would have rendered Applicant's claimed invention obvious those having ordinary skill in the art of liquid crystals at the time the claimed invention was made. Additionally, it is respectfully pointed out that Applicant did not claim the use of conductive protrusions extensively and evenly in claims 7-11; Applicant broadly claims a protrusion.

Response:

Please refer to the response to the rejection over claims 1-6 under 35 U.S.C. 103(a) (item 1), the Applicant believes that claim 1 of the present application is absolutely different from the combination of Matsuyama's disclosure and Sato's disclosure. Reconsideration of the rejection over claims 1-11 is hereby requested.

Sincerely,

Winston Hsu Date: 2/20/2004

Winston Hsu, Patent Agent No. 41,526
P.O. BOX 506
Merrifield, VA 22116
U.S.A.
e-mail : winstonhsu@naipo.com.tw
(Please contact me by e-mail if you need a telephone communication and I will return your call promptly.)